

- 58 -

CLAIMS

1. A highly durable heat insulating material characterized by having a thermally sprayed film of refractory ceramic on a surface of a formed body of an inorganic refractory fiber which surface is covered with a cloth material or was covered with the cloth material until it burned out during the fabricating process of the heat insulating material, with an application film of a surface hardening material between the thermally sprayed film and the fiber body.

2. A highly durable heat insulating material, according to claim 1, characterized in that the size of the mesh of said cloth material is such that a raw material mix of the constituents of the surface hardening material can pass through it without separating into component materials.

3. A highly durable heat insulating material, according to claim 1 or 2, characterized in that the size of the mesh of said cloth material is from 0.2 to 10 mm.

4. A highly durable heat insulating material, according to any one of claims 1 to 3, characterized in that said cloth material is composed of a burned out cloth material, an unburned residual cloth material or a combination of the two.

5. A highly durable heat insulating material, according to any one of claims 1 to 4, characterized in that said inorganic heat insulating fiber is composed of alumina-silica, clay, zirconia, mullite, zircon, magnesia, calcia, dolomite, silicon carbide, silicon nitride, carbon fiber, or a combination of two or more of them.

6. A highly durable heat insulating material, according to any one of claims 1 to 5, characterized in that said refractory ceramic powder material is composed of one or more selected from the group of alumina-silica, fire clay, zirconia, mullite, zircon, magnesia, calcia, dolomite, chamotte, corundum, bauxite, alunite, silicon

- 59 -

carbide and chromite as simple substances and composites of them.

7. A highly durable heat insulating material, according to any one of claims 1 to 6, characterized in that the high temperature characteristic of said application film of the surface hardening material is similar to that of the thermally sprayed film of the refractory ceramic.

8. A method of fabricating the highly durable heat
10 insulating material, according to any one of claims 1 to
7, characterized by:

covering a surface of the formed body of the inorganic heat insulating fiber with the cloth material;

15 applying the raw material mix of the constituents of the surface hardening material to the surface of the formed body of the inorganic heat insulating fiber covered with the cloth material; and

forming the application film of the
20 surface hardening material and the thermally sprayed film
of the refractory ceramic by spraying refractory ceramic
powder material by flame fusion coating onto the surface
of the formed body of the inorganic heat insulating fiber
to which the raw material mix of the constituents of the
25 surface hardening material has been applied.

9. A furnace characterized by using the highly durable heat insulating material according to any one of claims 1 to 7 as a part or the whole of its refractory.

10. A smoke exhaust facility characterized by using
30 the highly durable heat insulating material according to
any one of claims 1 to 7 as a part or the whole of its
refractory.

11. A tunnel characterized by using the highly durable heat insulating material according to any one of
35 claims 1 to 7 as a part or the whole of its refractory.

12. A method of installing the highly durable heat insulating material for the use, according to any one of

- 60 -

claims 9 to 11, characterized by:

covering a surface of a steel shell, a
refractory material or concrete with a formed body or
bodies of the inorganic heat insulating fiber a surface
5 of which is covered beforehand with the cloth material;

applying the raw material mix of the
constituents of the surface hardening material to the
surface of the fiber body covered with the cloth
material; and

10 forming the application film of the
surface hardening material and the thermally sprayed film
of the refractory ceramic by spraying the refractory
ceramic powder material by flame fusion coating onto the
surface of the formed body of the inorganic heat
15 insulating fiber to which the raw material mix of the
constituents of the surface hardening material has been
applied.

20031118 0440